

Research Article

COVID-19 in Sudan: Will the mitigation Efforts win against the Virus?

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Abstract

Background: The COVID-19 pandemic has hit hard both the affluent and poor countries. The objective of this article is to highlight the efforts of the Ministry of Health in Sudan in mitigating the pandemic and reflecting on counteracting factors.

Methods: We traced the reports and plans of the Federal Ministry of Health and looked at the models projecting the pandemic in Sudan.

Results: The fundamental plan of the government of Sudan to cope up with the pandemic included the control of the source of infection, blocking transmission, and preventing the spread. The response mechanism had a multi-sector approach with involvement of government, civil society organizations, and non-governmental organizations (NGOs). The action plans involved protocols for COVID-19 diagnosis and treatment, surveillance, epidemiological investigation, and management of case contacts. However, several factors continued to jeopardize the mitigation efforts of these plans. At the time of writing this article (at the end of the May 2020), there were about 4,000 confirmed cases, 300 recoveries, and 170 deaths. Although these numbers are below the projected numbers in many proposed models, in the light of the limited testing capacity, case identification and contact tracing, the exact situation might not be ascertained.

Conclusion: Sudan has prepared a national plan to prevent and contain COVID19 pandemic. However, tremendous challenges are opposing these efforts. The poor health infrastructure, fragility of the health system, and the economic crisis are the major obstructions.

Keywords: COVID-19, Sudan, preventions

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1. Introduction

Coronaviruses are important pathogens in humans that can also be transmitted from animals and cause disease ranging from common cold to severe or even fatal respiratory infections [1].

In December 2019, a new strain of coronavirus, named Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), was first isolated from three patients with unusual pneumonia; this was later given the name of Coronavirus Disease 2019 (COVID-19) by the Chinese Center for Disease Control and Prevention [2, 3]. Epidemiological reports soon proved person-to-person transmission of the disease [4, 5]. However, it was not until January 30, 2020 that the World Health Organization (WHO) declared the COVID-19 outbreak a “Public Health Emergency of International Concern” (PHEIC). As of February 28, 2020, a steady rise was seen in the number of patients infected with COVID19 globally, with an increase in mortality rate [6]. Subsequently, on March 11, 2020, WHO declared COVID-19 a “Pandemic” and urged all nations to take global steps in containing the infection [7].

At the time of writing this article (i.e., May 26, 2020), there were more than 5.6 million confirmed cases of infection in 213 countries, about 2.4 million recoveries, and about 348,241 deaths with an overall estimated case fatality rate of around 6% [8]. The case fatality rate of COVID-19 varies widely between countries, ranging from 0.2% to 7.7% [9].

While the first confirmed case of COVID-19 in Sudan was reported on March 13, 2020, there are currently 3,976 confirmed cases with 503 recoveries and 170 deaths with an estimated case fatality rate of 4.3% [10]. Due to the limited testing capacity and the location of test centers in few major cities only, these numbers may not reflect the exact situation.

2. Country Settings

Sudan is a developing country with a population of 43 million and a gross national income per capita of about USD 2,370 and the total health expenditure of the country is 7.2% of the general government expenditure. While more than 60% of the population is below the age of 25 years, 2.5% are above 65 and the average life expectancy is 65 years [11].

The country is standing amidst a storm of a political transitional period following a revolution that ended a 30-year dictatorship rule a year ago. Sudan is facing a lot of challenges including, but not limited to, severe economic crisis, multiple foci

of civil war, sociocultural conflicts, and widespread corruption inherited from the ex-government. In addition, there are several existence-threatening issues facing Sudan such as the economic sanctions imposed by the United States for more than 20 years, the continuous immigration of health professionals, and the limited budget allocated for health for the last three decades. All these factors have led to a very fragile health system, characterized by chaotic governance, poor infrastructure, irrational utilization, and scarce human and material resources. Having these facts in mind, a lot of questions are posed about the country's capacity to cope with the current COVID-19 pandemic.

3. The Health System in Sudan

The political and administrative governance of the country has been based on a presidential republic and a federal system. The health system can be categorized into three levels: federal, state, and local governments, and there are 18 states and 184 localities/districts in total [12].

While the federal government is typically responsible for the provision of nationwide health policies, plans, strategies, overall monitoring and evaluation, coordination, training, and external relations, the state government is concerned with the state's plans, strategies, and funding and implementation of plans based on federal guidelines. The localities on the other hand are responsible for the implementation of plans [12]. The health services provided in Sudan follow the classical three basic arrangements: primary, secondary, and tertiary healthcare. Primary healthcare (PHC) is the first point of contact for patients and includes, dressing stations, dispensaries, PHC units, and health centers located in urban and rural areas[13]. The importance of PHC is that it provides essential care to the population at large. The secondary and tertiary levels are responsible for providing more specialized medical services. However, in practice, much overlap exists between the three levels of service [14]. The coverage of the PHC units and centers is 1.5 per 10,000 population [14].

As in most low- and middle-income countries (LMIC), the healthcare system in Sudan is overwhelmed by a double burden of both communicable and non-communicable diseases [15]. Sudan is frequently hit by different types of disasters that require national response and sometimes international support, most of which are related to infectious diseases such as malaria and cholera outbreaks [15].

4. Sudan's Response to COVID-19

The first confirmed case of COVID-19 was reported on March 13, 2020. The patient was a male in his 50s, who had arrived from abroad less than a week ago. Despite being tested upon clinical suspicion, the diagnosis was not confirmed until a post-mortem sample was obtained [10]. On March 29, five more cases tested positive for the virus, all of whom were male adults and had arrived from high-risk countries. Case number 6, however, succumbed to the disease on the same day the disease was confirmed. Subsequently, the cases continued to be reported sporadically with some evidence of community transmission. The number of suspected cases and contacts of confirmed cases was in hundreds, many were unknown, not all of them were being tested, and therefore it was difficult to trace. According to the Situational Report released by FMOH on May 18, 2020, there were 4,258 suspected cases, 2,592 confirmed cases, 108 deaths (case fatality rate, CFR: 4.2%), and 222 recoveries. Moreover, about 81.4% of the Sudanese confirmed cases were reportedly from Khartoum state. Of the confirmed cases, 59% were male, and the age of those infected ranged from 1 to 70 years and above. Few cases were reportedly imported (n=27), while most were attributed to local transmission (2,565) [16].

According to the WHO Critical Preparedness, Readiness and Response Actions for COVID-19 and based on the transmission scenarios for COVID-19, Sudan is one of the countries experiencing larger outbreaks of local transmission [17]. The main purpose of the response plan for COVID-19 pandemic is to support the national capacity system so quick detection of new cases can be achieved and this may help in preventing a further spread of COVID-19 in Sudan.

The Higher Task Force Committee (HTFC) on COVID-19 pandemic in Sudan was established in January 2020 as a joint multi-sectors committee to assess the situation and coordinate the country's response. The HTFC proposed the national strategic plan to contain COVID-19 upon the following functional sections: surveillance, rapid response and case investigation teams, portals of entry, national laboratories, case management, infection prevention and control, operations support and logistics, risk communication and community engagement, coordination with other sectors, and legislations and laws. The main objectives were controlling the source of infection, blocking transmission, and preventing wide spread. The response mechanism has a multi-sector approach with involvement of government, civil society organizations, and non-governmental organizations (NGOs). The action plans involved: protocols for COVID-19 diagnosis and treatment, surveillance, epidemiological investigation, management of case contacts,

laboratory testing was formulated, and relevant surveillance activities and epidemiological investigations were conducted. And allocation of medical supplies was coordinated [18].

The Epidemiology and Emergency Department at the Federal Ministry of Health (FMOH) issues daily updates about the global and local situation of the pandemic including the number of confirmed cases, suspected cases, deaths, besides the imposed regulations, plans, and procedures. The FMOH provided hotline call numbers working over the hour to respond to public notifications or any queries from the sentinel sites and set into action rapid response teams. The surveillance system focuses on the rapid detection of cases and comprehensive and rapid contact tracing. Health quarantine was prepared for all arrivals from high-risk countries through airports and land-entry points. At the time of reporting, a few hundred suspected cases were tested and scheduled for isolation (either facility-based quarantine or self-isolation at home) for a minimum of two weeks. The National Public Health laboratory, in Khartoum, is the only diagnostic facility for testing specimens.

A few public hospitals in Khartoum and other states are prepared to receive cases that need critical care, however, in worse-case scenarios, the capacity of these hospitals will not cope with the expected cases. Currently, there are much less ventilators in the country than needed in case of widespread infection, most of them are located in Khartoum state, and in private health sector. The situation might have improved had aid been received from other countries and international organizations.

Based on clinical presentation, COVID-19 cases can be categorized as mild, severe, or critical. About 5% may be categorized as critical cases in which patients are likely to suffer respiratory failure and/or multiple organ dysfunction and need mechanical ventilation [19]. If COVID-19 cases followed the projected models in Sudan, the available beds with ventilators will not be sufficient for the expected number of patients, as projected in Figure 2. The WHO has set an Excel-based tool [The Essential Supplies Forecasting Tool (ESFT)] to help Member States manage essential supplies and forecast the estimated number of COVID-19 cases [19] (Figure 1).

The FMOH in Sudan predicts the modelling and estimating the numbers of expected cases, those who require hospital care, and intensive services. Three assumptions were put ahead during the preparation phase. First, this outbreak is expected to spread in urban areas rather than rural areas and blocked communities, therefore, the population at risk is estimated to be 34% of the population (>60% in rural areas). Second, as there is a lack of data regarding this pandemic, the assumption was calculated using the Wuhan incidence (0.21%) and doubling it for Sudan (i.e., 0.42%) – due to less

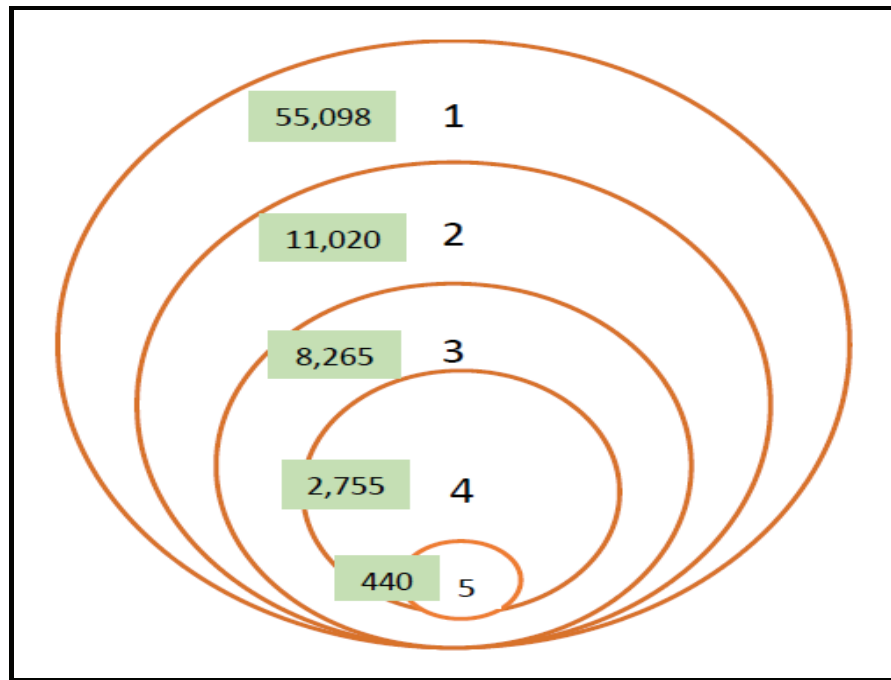


Figure 1: Crude estimation of COVID-19 cases in Sudan if mitigation efforts are put in place*.
 1: Asymptomatic or mild symptoms, but not tested; 2: Estimated patients tested positive for COVID-19; 3: Cases need hospitalization; 4: Patients who need ICU care; 5: *Projected number of mortality.
 *These estimated numbers are based on the WHO COVID-19 Essential Supplies Forecasting Tool [20].
 *The estimated mortality rate depends on the case fatality rate (CFR = 4.0%).

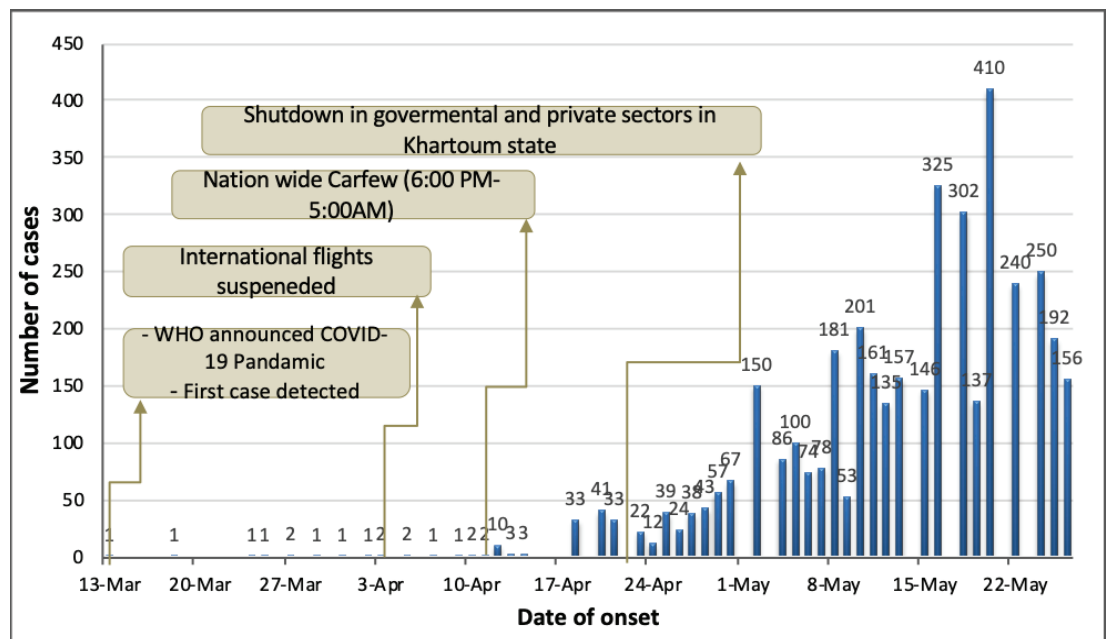


Figure 2: Confirmed number of COVID-19 cases in Sudan as of May 14, 2020 and mitigation measures.
Source: Federal Ministry of Health – Sudan (<http://www.fmoh.gov.sd>)

community response to social distancing and prevention measures. Thirdly, based on the population pyramid and prevalence of comorbidities, the high-risk groups and those expected to need hospitalization were calculated. Therefore, the projected numbers were round 60,000 expected positive cases, of which 11,000 were expected to require hospitalization and 3,000 intensive care. Of note, there are other models projecting higher number of cases.

So, in this phase, the Sudanese government emphasized the preventive measures to break the disease transmission chain, mainly by calling for social distancing, raising public awareness, and promoting hand washing. New laws and legislations have been set in place to restrict movement and prohibit mass gathering. Partial and complete lockdown has been imposed in certain cities.

4.1. Sociocultural factors favoring the worst-case scenario

- Poverty: the vast majority of the population (about 70%) is below the poverty line. Furthermore, the economic crisis is going to worsen as a result of lockdown. At a certain point of time, compliance with lockdown would not stand in front of the hunger revolution.
- Misbelieves about life, disease, and self are wide-spread, for example, the COVID-19 is fake news, blacks have more potent immune response than other races, being in malaria zone would give them protection, and many more unrealistic tales [20].
- The high number of refugees, homeless, and internally displaced people (IDPs) in Sudan who live either in crowded camps or have no shelter at all.
- The open and poorly controlled borders of Sudan with neighboring countries can facilitate the transmission of virus.
- The high illiteracy rate among the population that exceeds 25% can jeopardize control measures.
- The social and religious festivals, overcrowding in public places and around the common community services can increase COVID-19 transmission.
- Stigma and denial associated with COVID-19 is increasing in Sudan.
- The poor control of quarantine facilities, despite the hard efforts exerted by authorities. Self-isolation in most of our housing settings is not as it should be.
- The scarce personal protective equipment (PPEs) and lack of infection control measures can increase the risk for healthcare providers.

- The perceived concept that “all is well,” as evidenced by the low impact of previous viral outbreaks such as influenza, MERS-CoV-1, and SARS on the population health.
- There is a chance for a second wave in case of easing preventive measures such as social distancing, gathering, and wearing of masks.

5. Conclusion

Sudan has prepared a national plan to prevent and contain COVID19 pandemic. However, tremendous challenges are opposing these efforts. The poor healthcare infrastructure, fragility of the health system, and the economic crisis are the major obstructions. Therefore, the numbers of affected patients may exceed those of the initial wave, and Sudan may witness an unprecedented crisis in worst-case scenario. It has been stated that *“In times of uncertainty, facts bring clarity,”* however, in this COVID-19 pandemic neither facts nor clarity are foreseeable.

Declaration Section

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Competing Interests

No competing interest for all authors

Availability of Data and Material

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Abbreviations and Symbols

Non-governmental organizations (NGOs)
World Health Organization (WHO)
Public Health Emergency of International Concern (PHEIC)
Personal protective equipment (PPEs)
The Essential Supplies Forecasting Tool (ESFT)
Internally displaced people (IDPs)
Primary healthcare (PHC)
low- and middle-income countries (LMIC)
Federal Ministry of Health (FMoH)

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